

REMARKS

The applicants request further consideration and re-examination in view of the amendments above and remarks set forth below.

Claim Numbering:

The claims as originally filed lacked a carriage return between claims 10 and 11. Thus, it may have appeared that claim 11 was missing when it was not. In the Official Action mailed on March 4, 2004, the examiner indicated that claims 12-48 were misnumbered and suggested that they be renumbered as claims 11-47. The applicants submit that if the claims are renumbered in this manner, there will then be two claims numbered 11: original claim 11 and original claim 12. Therefore, in accordance with 37 CFR 1.126, which requires that the original numbering of the claims be preserved throughout prosecution, the applicants respectfully submit that the claims should not be renumbered. Accordingly, the listing of claims attached to this paper retains the original numbering with claims 10 and 11 set out separately. The applicants refer to the original claim numbering throughout this response.

Status of Claims:

The status of the claims is summarized as follows, using the original claim numbering:

Claims 1-48 were pending; of these, claims 5-14, 29 and 31-43 were withdrawn from consideration as being drawn to a non-elected species. Therefore, claims 1-4, 15-28, 30 and 44-48 were under consideration; of these, claims 1-4, 15-18, 20-23, 28, 30 and 44-48 were rejected and claims 19 and 24-27 were objected to. While the Office Action Summary includes claims 17, 27, 43 and 46 among those that were rejected, the examiner has not provided any basis for their rejection. These are dependent claims; as is explained below, each is allowable at least because it depends from an allowable base claim.

By the above amendments, the applicants have amended claims 1, 4, 16, 18, 45 and 48 and added new claims 49-52.

Information Disclosure Statement:

The examiner indicated that the Information Disclosure Statement fails to comply with 37 CFR 1.98(a)(2) because a copy of reference AG by Malluhi, et al. was not supplied with the Information Disclosure Statement.

The applicants hereby submit a supplemental Information Disclosure Statement, together with a copy of the Malluhi, et al. reference and the fee under 37 CFR 1.17(p).

Claim Rejections under 35 U.S.C. § 112:

Claim 16 was rejected as being indefinite for reciting “verifying.” Because “verifying” is also recited in claim 1, the examiner stated that it was unclear whether the applicants intended to refer to the “verifying” in claim 1.

The applicants have clarified claim 16 by preceding “verifying” with “the”.

Rejections under 35 U.S.C. § 102:

Claims 1-4 and 15 were rejected as being anticipated by applicant admitted prior art. Particularly, the examiner stated that the applicants “implicitly admitted that cooperative data backup among network nodes without centralization control was prior art (spec. page 3, l.15-page 4, line 3).”

The applicants disagree with the examiner’s characterization of the applicants’ specification at page 3, line 15 to page 4, line 3, as admitting prior art. In order for subject matter to be admitted as prior art, there must be a clear statement by the applicant that the work constitutes “prior art.” See, Manual of Patent Examining Procedure at Section 2129. The applicants have not made such an admission. Rather, at page 3, line 15, to page 4, line 3, the applicants discuss a paper by Chen, et al. which is listed on the Information Disclosure Statement submitted by the applicants and which is indicated on the copy of the Information Disclosure Statement returned with the office action as having been considered by the examiner.

Because the applicants’ specification does not admit prior art, the applicants respectfully request that the rejection be removed.

Claims 1-4, 15-17, 45-46 and 48 were rejected as being anticipated by U.S. Patent Application Publication No. 2002/0049778 (hereinafter “Bell”).

The applicants disagree with the rejection. The applicants note that the rejection applies Bell under 35 U.S.C. §102(e). Though the applicants address the

teaching of Bell herein, the applicants do not thereby admit that Bell constitutes prior art. The applicants specifically reserve the right to show that Bell does not constitute prior art, if appropriate.

The present invention is directed toward backing up data in a system that includes a plurality of computers that may be individually unreliable and untrustworthy but with the system providing reliable and secure backup of data. Applicants' specification at page 7, lines 1-6. Computers of the system cooperate by forming backup partnerships in which backup partners agree to back up each other's data. Applicants' specification at page 7, lines 6-10. These partnerships are formed by a computer selecting a prospective backup partner and establishing a reciprocal agreement with this partner. Applicants' specification, at page 17, line 14, to page 18, line 17. This process may be repeated to increase the number of computers in the partnership. Applicants' specification, at page 19, lines 26-30. Once the computer has partnered with a sufficient number of other computer systems, the backup partners proceed with backing up each other's data. Applicant's specification, at page 20, lines 10-14. Thus, data to be backed up is then distributed to the backup partners. Applicants' specification at page 11, lines 3-9.

The backup partners mutually impose on each other the duty to maintain the backup data. Applicants' specification at page 9, lines 15-16. In essence, a first computer assumes the task of holding backup data received from a second computer and, in return, the second computer assumes the task of holding backup data received from the first computer – hence, the name “backup partners.” Applicants' specification, at page 9, lines 10-13. The cooperative backup operations from the standpoint of one computer system apply similarly to other computer systems on the network. Applicants' specification at page 11, lines 13-14. Thus, the cooperative interaction between the collection of computer systems forms a distributed backup, where each computer receives backup services from its backup partners in return for it providing backup services to its backup partners. Applicants' specification at page 11, lines 15-17.

The partners periodically monitor each other's performance of the reciprocal agreement to ensure that the backup partner's have faithfully stored the data entrusted to them. Applicants' specification at page 12, lines 10-14. This ensures that the previously backup data will be available if needed. Applicants' specification at page 12, lines 10-11.

Accordingly, claim 1 is directed toward a method for backing up data on a plurality of computers connected via a network. The method includes: forming one or more partnerships among the plurality of computers such that each computer in a partnership commits under an agreement to store backup data received from one or more of its backup partners; backing up data in accordance with each agreement; and periodically verifying that previously backed up data is being retained by the computers committed to act as backup partners in accordance with each agreement.

The applicants have amended claim 1 to improve its clarity. Specifically, the applicants have amended claim 1 to clarify that when a computer commits to store backup data received from its backup partners, this means that a first computer in the partnership assumes the task of storing backup data received from one or more other computers in the partnership and one or more other computers in the partnership assumes the task of storing backup data received from the first computer.

Bell does not suggest or disclose such a feature in which a plurality of computers cooperate to store each other's backup data. Rather, Bell teaches an information outsourcing system that is conventional in that enterprise sites transfer and store data at remotely located and storage sites without reciprocity. See, Bell, Abstract and para. 11.

More particularly, in Figure 1 of Bell shows that a storage provider, through a storage system 100, provides information storage for enterprise sites 106a-106c. Bell at para. 40. A storage node 102 provides the storage capabilities of the storage system 100. Bell at para. 41. The storage system 100 of Bell can provide primary storage for information generated by the enterprise sites 106a-106c. Bell at para. 44. This means that the storage system provides storage and retrieval capabilities of sufficient non-volatility, capacity, and performance to support booting of the operating system executing on the enterprise site computer, swapping of executing application processes, paging of virtual address space pages of applications executing on the enterprise site computer, file systems mounting, and the like. Bell at para. 43. This requires high bandwidth data transfer communication channels between the enterprise sites 106a-106c and data storage systems 108a-108b. Bell at para. 45.

Bell discloses several types of storage nodes: one for providing primary storage services to an enterprise site computer (at paras. 55-58); one for providing mirrored storage services of the primary storage of an enterprise site computer (at paras. 59-61); one for providing backup storage services for the primary storage of an

enterprise site computer (at paras. 62-70); one for providing network storage services to support on-line storage requirements of an enterprise site computer (at paras. 71-73); and one for providing storage services to support multiple geographically disbursed enterprise sites associated with different enterprises (at paras. 74-85). Further, Bell teaches several system configurations: one in which the enterprise site computers are located within close proximity to a storage node (at paras. 86-87); one in which enterprise sites are located within regions each in communication with a global operations center over a public network (at para. 88); one in which a region contains multiple storage nodes fiber-optically connected to their associated enterprise sites (at paras. 89-91); and others.

In all embodiments of Bell, however, storage service is provided to enterprise sites by dedicated storage nodes. There is no teaching or suggestion in Bell of any reciprocity of data storage between the enterprise sites and the storage sites. Thus, Bell does not suggest or disclose that computers in a backup partnership agree to back up each other's data, as in the present invention. While Bell discusses service level agreements at para. 14, these simply specify the level of service that a storage service provider is to provide to the enterprise sites; Bell does not teach or suggest that such service level agreements could cover reciprocal storage in which computers in a backup partnership agree to back up each other's data, as in the present invention.

From the above, it is clear that Bell does not suggest or disclose that each computer in a partnership commits under an agreement to store backup data received from one or more of its backup partners, whereby a first computer in a partnership assumes the task of storing backup data received from one or more other computers in the partnership and that one or more of the other computers in the partnership assume the task of storing backup data received from the first computer, as is required by claim 1. For at least this reason, claim 1 is allowable over Bell. Claims 2-4, 15-28, 30 are allowable at least because they are dependent from claim 1.

Moreover, because the reciprocal nature of the applicants' invention, in which a first computer provides backup data storage service to one or more other computers in exchange for one or more of the other computers providing backup data storage service to the first computer, it is important for a computer to be able verify that its backup partners are, in fact, adhering to the agreement. Bell does not suggest or disclose such a feature. However, the applicants' claim 1 requires periodic verification. Therefore, this is another reason why claim 1 is allowable over Bell and

is also another reason why claims 2-4, 15-28 and 30 are allowable, being dependent from claim 1.

Claims 45 and 48 are amended to improve their clarity, similarly to claim 1. Specifically, the applicants have amended claims 45 and 48 to clarify that a first computer in each partnership assumes the task of storing backup data received from one or more other computers in the partnership and one or more of the other computers in the partnership assume the task of storing backup data received from the first computer. Claims 45 and 48 also recite periodic verification that previously backed up data is being retained. As explained above, Bell does not teach or suggest either of these features. For at least these reasons, claims 45 and 48 are allowable. Claims 46 and 47 are allowable at least because they depend from an allowable base claim 45.

Rejections under 35 U.S.C. § 103:

Claims 19 and 21 were rejected as being unpatentable over Bell “and what was well known in the art.” Claims 20 and 22 are rejected as being unpatentable in reliance on Bell and on applicant admissions.

Claims 19-22 are dependent from an allowable base claim 1. For at least this reason, claims 19-22 are allowable. Moreover, as explained above, the applicants have not admitted prior art. This is another reason why the rejection of claims 20 and 22 should be removed.

New Claims:

Claim 49 recites a method for backing up data on a plurality of computers connected via a network, comprising: exchanging messages among computers of the plurality to determine the ability of each to satisfy backup storage requirements of one or more others; forming a partnership among computers of the plurality in which a first computer in the partnership stores backup data received from one or more other computers in the partnership and one or more of the other computers in the partnership store backup data received from the first computer; and each of the computers in the partnership periodically verifying that its backup data is being retained by one or more of the other computers in the partnership. New claim 52 recites computer readable media having stored thereon computer code for a method similar to that of new claim 49.

New claims 50 and 51 are dependent from claim 49. New claim 50 recites that the verifying includes selecting a block of the previously backed up data wherein the selecting is not controlled by any one of the computers individually. This feature is supported by the applicant's specification at least at page 12, lines 27-29. New claim 51 recites that the partnership consists of two computers. This feature is supported by the applicant's specification at least at page 16, lines 27-29.

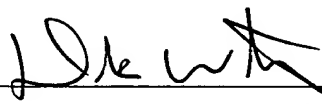
Similarly to claims 1, 45 and 48, new claims 49 and 52 recite that a first computer in the partnership stores backup data received from one or more other computers in the partnership and one or more of the other computers in the partnership store backup data received from the first computer. New claims 49 and 52 also require verification that previously backed up data is being retained. As explained above, Bell does not teach or suggest either of these features. For at least these reasons, new claims 49 and 52 are allowable. Claims 50 and 51 are allowable at least because they depend from an allowable base claim 49.

Conclusion:

In view of the above, the applicants submit that all of the pending claims are now allowable. Allowance at an early date would be greatly appreciated. Should any outstanding issues remain, the examiner is encouraged to contact the undersigned at (408) 293-9000 so that any such issues can be expeditiously resolved.

Respectfully Submitted,

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Derek J. Westberg (Reg. No. 40,872)